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# SPECIALIZATION AND INTEGRATION OF PRODUCTION PLANNING IN BULGARIA'S MACHINE-BUILDING INDUSTRY

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In a short period of time, Bulgaria has achieved significant successes in the construction of socialism. The country has been transformed from a backward agrarian country into an industrial and agrarian country. In the socialist reconstruction of the country's economy, heavy industry has become the sound foundation and source of development for all branches of the national economy.

Domestic machine building is playing a large part in the industrialization of Bulgaria. After the nationalization of industry and especially during the First and Second Five-Year Plans, machine building became an important branch of heavy industry and the economy as a whole. During this period, the reorganization and consolidation of nationalized small-scale enterprises were completed. New machine-building plants were built, and many of the old enterprises were reconstructed and equipped with new, modern equipment. The artisan's method of work was replaced largely by the semiplant and plant method of work, and the work of laborers was specialized. As a result, the assortment of products of the machine-building industry increased, production of new types of machines was mastered, equipment was more extensively utilized, and many enterprises were freed from side aspects of production that did not pertain to them directly. Machine-building production increased nearly elevenfold from 1948 to 1955.

The present economic upsurge in Bulgaria is indissolubly connected with the widespread introduction of new equipment in production and with the struggle for technical progress. Moreover, the struggle for technical progress, for an uninterrupted improvement in production equipment, is an extremely important task inseparably related to the development of domestic machine building. To carry out this task accurately and quickly, therefore, the organization of the machine-building industry must be constantly improved, and must entail the widest possible use of specialization, coordinated integration of production planning, and other such forms of production organization.

Technical progress calls for the specialization of various functions of the production process. The very process of technology leads to the specialization of various aspects of production and requires that the manufacture of the same product be concentrated in mass production by specialized enterprises, rather than distributed among many enterprises.

The technical level of production in specialized plants is significantly higher than in plants of the more universal type. In specialized enterprises, conditions are created for a more accurate and more effective utilization of personnel (designers, technologists, and supervisory engineering and technical personnel), machines, and tool bases and other production shops. When high-production machinery and perfected technological processes are used in specialized plants, savings in materials of up to 30-40 percent are realized, time consumed in mechanical processing and other operations is cut in half, labor productivity is increased, the quality of production is improved, and the cost of production is decreased.

With integration of production, the available reserves of an enterprise's production capacities are distributed and utilized to the greatest extent. Invested capital, in turn, is economized and can be used for other purposes. Through integration, the profitability of individual machine-building plants is raised significantly.

Integration of planning assures production of parts with uniform design and uniform dimensions and large series-production with homogeneous parts produced according to a single technological process, requiring only a change in work tools or readjustment of equipment in transferring from one series to another.

Specialization and integration in Bulgarian machine building are in the beginning stage. During 1953, the Ministerial Council and the Central Committee of the Bulgarian Communist Party issued a special decree on the specialization and integration of machine-building plants of the Machine-Building Administration in the system of the Ministry of Heavy Industry. The decree approved the basic activity of the machine-building enterprises with a view to their further specialization. Several enterprises having approximately the same activity were consolidated to decrease their number and improve their organization of supply, equipment, and management.

At almost the same time, the first measures were taken to intregate machine-building enterprises of various departments of the Ministry of Heavy Industry, the Ministry of Electrification, the Ministry of Agriculture, and the Ministry of Transport.

What has been done to determine the activity and specialization of basic machine-building enterprises had had positive results, but it is far from sufficient. In many enterprises, little has been done to establish a basic outline of activity and specialization. In several enterprises, the principle of specialization is not being observed; orders are being issued to plants which are not designed to turn out the type of product desired. For example, the "Vulko Chervenkov" Plant in Sofia, which specializes in metal-cutting machinery, was required under its 1955 plan to produce 5 spring hammers, 13 pneumatic hammers, 8 sixty-ton eccentric presses, 12 foundry presses type 271, and other machinery. This assignment

diverted the attention of engineering and technical personnel from their work of improving and perfecting the production of metal-cutting machinery in the plant. During the second quarter of 1955, this mistake of the Machine-Building Administration was corrected, and the "V. Kolarov" Machine Plant in Stalin, which specializes in the production of the desired machinery, was given the production order.

The production of a "Pelton" water turbine, a power machine, was included in the production program of the "Stalin" Plant in Dimitrovo, which specializes in mining machinery and equipment. The "N. Vaptsarov" Plant in Pleven specializes in the production of water turbines. There are similar cases in a number of enterprises in the system of the Machine-Building Administration.

Although planned as early as 1952, integration did not begin until 1954. Since 1955, about 15 percent of the deliveries in machine-building plants of the Ministry of Heavy Industry have been coordinated, and about 5 percent in the Electric Power Administration. Integration is carried out mostly between plants of individual administrations; only a small amount is carried between individual administrations and departments.

Integration has not proceeded systematically and has often caused the consumer plant to fail to fulfill its plan because of lags in the work of the supplier plant. During 1955, the "Stalin" Plant in Dimitrovo hindered the work of the Machine-Building Plant in Troyan, the "Vaptsarov" Plant in Pleven, the "Sila" Plant in Yambol, and other plants by failing to deliver steel castings on time, although the plants are all under one administration.

A number of failures in integration during the last 2 years have occurred as a result of poor planning by the Machine-Building Administration and the Ministry of Heavy Industry. Because of late clarification and approval of production plans, the integration plan has been worked out later and later. Although it is usually sent to enterprises during February, it provides for production of parts according to plan for the first quarter. Naturally, the supplier enterprise is late, and this, in turn, disrupts the plan of the consumer enterprise.

Many times the integration plan specified the production of parts which, if produced by an enterprise [other than the one specified?], would be cheaper and of the same quality.

During 1956, integrated deliveries of the Machine-Building Administration were significantly larger than during 1955. Integration is carried out between enterprises of the Machine-Building Administration system; with enterprises outside the system of the administration but of a department of the Ministry of Heavy Industry, which includes the Machine-Building Administration; and with enterprises of other governmental organs, such as the Ministry of Electrification, the Ministry of Transport, and the Sofia Urban People's Council.

Despite the 1956 improvement over 1955 fulfillment of planned assignments for coordination between machine-building plants, a number of shortcomings still exist. For example, although the integration plan of the machine-building enterprises was prepared and sent to the enterprises on time, changes were subsequently made in the Machine-Building Administration's plan which brought about changes in the integration plan.

Some plants are not delivering the necessary parts on time or are delivering low-quality parts, thereby disrupting the plan fulfillment of consumer enterprises. Because the State Spare-Parts Plant in Sofia and the "Vulko Chervenkov" Plant in Sofia could not supply the "Strug" Machine-Building Plant in Nova Zagora with reductor gearboxes for spraying machines, the "Strug" Plant was unable to produce 50 sprayers. Because the "G. Dimitrov" Machine-Building Plant in Vidin was unable to supply pumps for several boilers to the "G. Kirkov" State Rubber Plant in Sofia, the lag in production of steam boilers during January could not be made up. The "G. Dimitrov" State Machine-Building Plant in Ruse was late in delivering tempered castings to the "Mashstroy" State Machine-Building Plant in Troyan. Plants No 11 and 12 could not fulfill their integration assignments in agreement with the plan approved by the ministry and could not supply the "V. Kolarov" Plant in Stalin with parts of diesel and gasoline motors.

Shortcomings were noted during April also. The State Spare-Parts Plant in Sofia did not supply the "V Kolarov" Plant in Stalin with gearwheels for 18-horsepower diesel motors on time. Because the "Anton Ivanov" Plant in Plovdiv was late in delivering cast iron molds to the "Anton Ivanov" State Chemical and Aniline Plant in Sofia, the Sofia plant was unable to complete the production of several machines scheduled for April. The "G. Dimitrov" State Machine-Building Plant in Ruse sent the "Mashstroy" Plant in Troyan poor-quality molds of tempered cast iron for Heller annunciators. The "Elektrometal" State Industrial Enterprise supplied the State Spare-Parts Plant in Sofia with poor-quality castings for DT-54 bearing parts, and the "Stalin" Plant in Dimitrovo did not send all the planned parts for drills to the "Sila" State Machine-Building Plant in Yambol.

Because plants of the Electrical Industry Administration did not supply Plant No 12 with electrical appliances for sprayer motors, the plan [unspecified ] for Plant No 12 was not fulfilled.

In Plovdiv, the "Anton Ivanov" Plant of the Metalworking Administration did not supply bolts and nuts for the production of agricultural machinery. This hindered the production of U-5M motors, haymaking machines, seed-cleaning machines, and other machinery. Plants of the Machine-Building Administration were compelled to produce bolts and nuts for machines; this disrupted their own regular production.

A characteristic weakness of almost all plants is that they do not devote enough attention to integrating plan fulfillment. In general, the task of integration is underrated. Efforts are directed almost exclusively to fulfilling a plant's own production plans, as if the integration plan were not the plant's "own" plan. The managements of several plants do not feel responsible for the integration plan and do not devote enough attention to it.

Consumer plants are also guilty of shortcomings, in that they do not always promptly clarify needed integration details and do not supply blueprints and models on time.

Present practice has shown that the disconnection between individual departments is not conducive to specialization and integration and does not allow production capacities to be fully utilized. For example, according to approximate data, the utilization of basic equipment in plants under the Machine-Building Administration in a two-shift program was as follows: according to time utilized, 77.6 percent in 1953, 78.2 percent in 1954, and 78.8 percent in 1955; and according to installed capacity, 27.6 percent, 21 percent, and 23.5 percent in the same years, respectively. These data do not include capacity utilization in metallurgical enterprises.

The situation is similar in the utilization of machinery in plants under the Transport Industry Administration. For the remaining administrations there are no data on how their production capacities are utilized. Since no account of these indexes has been kept, the managements of administrations and enterprises do not know to what extent machinery is being utilized, and the information they do supply is unrealistic. The following conclusion may be drawn, however, from an analysis of shift programs in the utilization of basic equipment: in the Electrical Industry Administration of 929 basic machines on hand, 573 are working in one shift, 235 in two shifts, and 31 in three shifts; on the basis of a two-shift program, therefore, the average shift coefficient is 1.4, leaving a free unutilized production capacity of 0.6.

In the Transport Industry Administration, screw-cutting lathes work on 1.52 shifts, vertical boring lathes on one shift, turret lathes on one shift, tire mills on one shift, boring machines on one shift, and milling machines on one shift. Basic machines and equipment in this administration during 1955 were utilized on one shift. In the Machine-Building Administration, however, lathes were worked an average of 2.5 shifts and boring machines, 3 shifts. Data show that the tendency in individual enterprises is to be self-satisfied and not uncover their available production capacities with which integrated orders for other enterprises could be completed.

The manufacture of machine-building products of one type is carried out in various departments. The same product is produced in several plants belonging to several departments and administrations; for example, bridge cranes, manual and electric, are produced in the "Stalin" Plant in Dimitrovo, under the Machine-Building Administration; in the "Khr. Smirnenski" Plant in Sofia, under the Ministry of Electrification; in the "Proms" Plant in Sofia under the Ministry of Construction; in the "Vulko Chervenkov" Equipment and Installations Plant in Sofia, under the Ministry of Transport; and in the "Tolbukhin" Repair Plant, under the Ministry of Agriculture.

Such duplication and triplication can be pointed out in the manufacture of many other products. This dismemberment of the machine-building industry does not allow the specializing of enterprises to its greatest extent and does not allow the industry to be developed as a whole.

A plan of national dimensions has still not been worked out for specialization in machine buildings.

All machine-building plants produce a large quantity of identical parts performing the same work in various machines under identical conditions. These parts must be maximally standardized to permit them to be series-produced according to single blueprints in specialized plants.

The main direction in the further development of machine building is to adopt the principles of series production and mass production. Parts must be systematically standardized, units and machines must be made uniform, technological processes must be standardized, the aggregate processing of parts must be introduced, and units, shops, and plants must be specialized. The Ministry of Foreign Trade must put an end to the diversity of the automobile and tractor park in Bulgaria which is supplied with Bulgarian spare parts.

Designing organizations of ministries and departments and designing divisions of basic machine-building plants must re-examine designs, parts, and units common to various machines in individual brances of machine building. For example, agricultural machines must be made uniform with standardized parts and units of a uniform design, but with moving parts, axles, gearboxes, bearing castings, gears, etc., in different sizes.

In drawing up operational blueprints of uniform parts, plant technologists must assist in meeting the requirements for mass production of these parts. For strict adherence to uniform designs, a special central control must be organized to approve all operational blueprints of machines which are to go into series production. At the same time, strict accounting of the use of unifrom parts and a special system for formulation of their technical documentation must be organized. A quick and complete introduction of these measures will make it possible to calculate the essential volume of parts whose production is necessary to organize specialized mass production. These measures must not be examined sporadically and temporarily, but must be systematically carried out. This is one of the important future assignments on which the newly projected Scientific Research Institute for Machine Building must begin work and which it must solve, in conjunction with the Institute for Standardization, the "Mashproekt" Departmental Machine Construction Organization, and designing divisions of plants.

There is still no complete perspective plan for integration; thus, contact between the consumer and producer enterprise is weak; the former cannot rely on prompt delivery, and the latter is unable to prepare for prompt fulfillment.

The Ministerial Council, the ministries, and the administrations do not periodically check the fulfillment of the integration plan, and its nonfulfillment is noted only when the plan of the consumer enterprise falls short of completion.

Quick and timely action must be taken to remove the shortcomings and weaknesses in planning and fulfilling integration plans and to outline measures for strengthening first achievements and expanding specialization and integration in the Bulgarian machine-building industry.

The already-existing integration of production is being carried out with difficulty outside the systems of individual ministries and departments. The production of new types of machines is not being centrally supervised, with the result that two or more departments are simultaneously producing the same type of machine.

The dissociation of individual departments leads to irrational utilization and placement of capital investments. A typical example is the unjustified spontaneous investment of capital in the construction of foundries in plants of all departments. The foundries are often concentrated in the same cities. In Sofia, there are foundries in the "G. Dimitrov" Locomotive and Railroad Car Plant, the "V. Chervenkov" Equipment and Installations Plant, the "V. Chervenkov" Metal-Cutting Machinery Plant, the "Proms" Plant, the "6 Septemvri" Plant, the "V. Kolarov" Plant, Plant No 12, and several cooperatives. The situation is no better in Stalin, Plovdiv, Pleven, Stara Zagora, Burgas, and other cities. As a result, many foundries have been constructed, but they are small in area, unmechanized, and have a very low productivity. The average productivity in Bulgaria is 10 tons per worker annually, as compared with 40 tons in the Soviet Union. The productivity of individual foundries during 1955 fluctuated from 0.52 to 3.5 tons per square meter. In the "G. Dimitrov" Locomotive and Railroad Car Plant, as a result of the introduction of conveyer smelting, productivity in smelting parts for railroad-car brakes increased to 47.5 tons per square meter.

The consolidation and regionalization of cast-iron foundries will lead to mechanization of processes, improvement of technology, quality improvement, and elimination of defects, especially hidden ones. It is possible to construct modern foundires with a capacity which, through integration, can more economically satisfy more of the needs of machine building with a capital investment significantly lower than the amount individual departments spend for a large number of foundries.

In spite of shortcomings and weaknesses, specialization and integration have played a large role in this stage of the development of Bulgarian machine building. During 1954, under comparatively difficult conditions and with a shortage of electric power, consolidated and specialized plants of the Machine-Building Administration produced 16.7 percent more products than in 1953, and during 1955, 15 percent more than in 1954.

The results achieved support the correctness of the line taken in specialization and integration. However, there are still significant reserves in Bulgarian machine-building plants which can and must be uncovered and utilized for specialization and integration.

To eliminate weaknesses and shortcomings in machine building, basic machine-building enterprises must be united under one management. This would lead to a more accurate designing and specialization of enterprises, a properly directed development of the machine-building industry as a whole, a more efficient utilization of the present widely dispersed machinery park, a more operational and competent management of enterprises, and a more accurate planning of capital investments for construction and for supplying plants with machines and equipment. The present practice of supplying the same machines for various departments without taking into account their complete utilization will be curtailed. Labor payments and standardization and the distribution and utilization of engineering and technical personnel will be more correct. The technological situation will be improved; modern, mechanized regional foundries will be constructed; and specialized, high-performance equipment for mass production will be provided. The unification of the machine-building industry under one management will create conditions for large-scale series production. All this will help to increase output and labor productivity and to lower the cost and improve the quality of machine-building production.

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